ORIGINAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's	)	
Rules to Add Intelligent	)	
Transportation Services As a New	)	RM - 9096
Mobile Service With Co-Primary	)	
Status at 5.850 to 5.925 GHz	)	

REPLY COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE,INCORPORATED

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September 17, 1997

TABLE OF CONTENTS

SUMMARY

The American Radio Relay League, Incorporated, (the League) the national association of amateur radio operators in the United States, by counsel, submits its Reply to certain of the Comments submitted in response to the Petition for Rulemaking (the Petition) filed on or about May 19, 1997 by the Intelligent Transportation Society of America (ITS America). The Petition seeks a primary allocation in the 5.850 to 5.925 GHz band.

There is no consensus in the comments regarding the extent of the costs and disadvantages involved in use of the 5.850-5.925 GHz band for ITS applications, and whether 902-928 MHz or other bands would prove more suitable and more cost-effective for ITS purposes. There is also serious confusion as to whether use of the band for DSRC is compatible with existing incumbent Part 15 and 18 users, and the Amateur Service. This confusion is apparently due, as Mark IV noted, to the current lack of information regarding protocols, channelization requirements, and propagation characteristics which might eventually be used in ITS applications. There is no empirical evidence offered by the Petitioner, or by the commenters which are supportive of the Petition, sufficient to permit a determination whether or not there is compatibility between existing uses in the band, including Amateur Radio, and ITS DSRC operations; whether 75 MHz of spectrum is or is not the minimum allocation necessary to implement ITS DSRC; or whether the band 5.850-5.925 GHz, *vice* the 902-928 MHz band, or the bands above 40 GHz, is best suited to accommodate ITS DSRC services without disruption of incumbent users.

Given the lack of information regarding critical technical aspects of the ITS America proposal, the League reiterates that any action taken by the Commission on the Petition is premature. The next step should, at most, be the issuance of a Notice of Inquiry. The Commission should call for objective evidence regarding the channelization needs and propagation characteristics of DSRC devices; consideration of alternative frequency bands; completion and submission of compatibility studies regarding ITS/DSRC devices and incumbent radio services at 5.850-5.925 GHz; a determination of protection criteria, if necessary; and identification of replacement spectrum for displaced users *before* any proposed implementation of a ITS/DSRC Service.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules	)	
to Add Intelligent Transportation Services	)	**RM-9096**
as a New Mobile Service with Co-Primary	)	
Status in the 5.850-5.925 GHz Band	)	

To: The Commission

REPLY COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED

The American Radio Relay League, Incorporated, (the League) the national association of amateur radio operators in the United States, by counsel and pursuant to Section 1.405(b) of the Commission's Rules [47 C.F.R. §97.405(b)], hereby respectfully submits its Reply to certain of the Comments submitted in response to the Petition for Rulemaking (the Petition) filed on or about May 19, 1997 by the Intelligent Transportation Society of America (ITS America).[1] The Petition seeks a primary allocation in the 5.850 to 5.925 GHz band. For its reply, the League states as follows:

1. Several of the comments submitted in response to the Petition, such as those of the State of Minnesota and the United States Department of Transportation, merely state support for the abstract ideal of an improved transportation infrastructure without addressing the substantive

[1] On May 19, 1997, the Intelligent Transportation Society of America (ITS America) filed its Petition for Rulemaking. Pursuant to Public Notice (DA 97-1106), the Commission specified that comments were due July 28, 1997. Reply comments were initially determined by the Commission to have been due August 18, 1997. However, by Order of the Chief, Office of Engineering and Technology (DA 97-1700) released August 8, 1997, the deadline for submission of reply comments was extended to September 17, 1997. Accordingly, these reply comments are timely filed.

technical merits of the spectrum allocation proposal submitted by ITS America. This group of comments leaves unaddressed: (i) reasonable alternatives to the proposed 5 GHz allocation; (ii) compatibility between the anticipated Dedicated Short-Range Communications (DSRC) devices and incumbent radio users in the band; and (iii) suitable replacement spectrum for any displaced incumbent users. In fact, apart from the Comments submitted by the League, only five commenters discussed the technical merits of the proposal at any length.

2. In its comments, BellSouth Corporation argued that a portion of the relevant spectrum requested for DSRC purposes should be dedicated to commercial mobile (CMRS) use and auctioned so as to establish regulatory parity with similarly-situated current users. The comments also suggested that the Commission should issue a Notice of Proposed Rulemaking to assess (i) whether a full 75 MHz is necessary for the proposed DSRC use (versus the 48 MHz actually deemed necessary for eight, 6 MHz-wide channels); (ii) the impact of the proposal on existing services in the band and on existing CMRS providers of ITS services in other bands; (iii) the possibility of distinguishing between public and private providers; and (iv) the appropriate use of Emerging Technology guidelines for clearing incumbents from the reallocated spectrum.[2]

3. ReSound Corporation noted, as did the League's Comments, that the Petition contained no technical discussion of the impact of the proposal on incumbent users, such that it is impossible to predict interference between DSRC applications, and such incumbent applications as low-power ISM devices. ReSound develops and manufactures radio frequency devices for hearing-impaired persons in the 5.850-5.875 GHz band.

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[2] It is interesting to note that the clearing of displaced users from the band is not a concept addressed by ITS America in its Petition; the Petition claimed compatibility with incumbent users at 5.850-5.925 GHz, and assumed therefore that no displacement will occur.

4. Saab Systems, Inc., argued that the 5 GHz band is to be preferred over the 902-928 MHz band for ITS purposes, because smaller transceivers and transponders could be used; because the 5 GHz band is not as heavily utilized as is 902-928 MHz; and because other countries have allotted bands proximate to 5.850-5.925 GHz for ITS applications. Saab Systems also notes that the 902-928 MHz band is relatively crowded, and thus insufficient to accommodate the proposed DSRC uses.

5. Mark IV Industries, Ltd., a manufacturer of high-rate data devices for ITS applications, on the other hand, argued that the 902-928 MHz band is currently the band of choice for short-range LMS systems, and that many new ITS applications are envisioned for that band for the near future. It notes that such systems, such as electronic toll collection and traffic monitoring services, are fully compatible with other shared users at 902-928 MHz, and should not be rendered obsolete by any new ITS allocations. Mark IV also asserts that there are serious technical and cost disadvantages which would exist if toll systems were to use 5.8-5.9 GHz rather than 902-928 MHz. Although the higher frequency band could allow for smaller radio units, Mark IV claims that there would be a much higher actual cost for necessary amplifiers and filters. It suggtests that there would also be significant propagation problems associated with the proposed band. More to the point, Mark IV states as follows:

> The ITS America Petition presents far-ranging technical and service proposals involving, for the most part, developmental applications of 5.8-5.9 GHz technologies. Particularly in the area of what ITS America characterizes as "Emerging" or "Future" DSRC-band services, its proposals include potentially innovative new services but little detail about service parameters, demand studies, projected costs, deployment options, technology choices and standardization efforts. Its Petition is a preliminary step in a process which will require detailed analytical review involving users, manufacturers and other interested parties.
>
> Mark IV Comments, at 3,4.

Mark IV's recommendations are that the Commission: (1) commence "broad-ranging inquiry proceedings to review the diverse and complex allocations, licensing and service issues presented in ITS America's proposals; (2) recognize the legitimate expectations of incumbent licensees deploying systems in the 902-928 MHz band and the millions of vehicle owners who rely upon those systems to continue use of them; and (3) confirm that use of existing bands will not be foreclosed by any allocation at 5.8-5.9 GHz.

6. Finally, Minnesota Mining and Manufacturing Company (3M) notes that, for functions involving one-way communications (low-power/low data rate), many narrowband channels can exist within the same amount of spectrum occupied by a wideband channel necessary for the two-way communications (high power/high data rate) uses. 3M suggests that the ITS America proposal entails no real threat of interference from co-primary users, but claims that the secondary users in the band, not necessarily being site-specific emitters, may be hard to locate. "Accordingly, 3M urges the Commission to remove secondary users from the proposed band." 3M Comments at 8. 3M proposes that the Commission adopt a two-step process to implement the ITS America proposal: First, 3M argues that the Commission should allocate the 5.850-5.925 GHz band to ITS on a primary allocation basis, (and clear all secondary users). Second, the Commission should develop channelization and operational standards for ITS systems.

7. The League is very much concerned about the proposal of 3M Corporation to delete secondary users from the band. This suggestion, which would involve an effort to render inoperable certain existing Part 15 and 18 devices now in use throughout the United States, is both unique among the comments and absent from any portion of the ITS America Petition. There certainly is no technical basis for the position that incumbent users at 5.850-5.925 MHz should be ousted in favor of DSRC uses. The sole argument advanced by 3M in support of that

proposition is that DSRC uses must be "interference free", and that these uses include intersection collision avoidance and other uses. As such, according to 3M, "(t)hese communication links require protection from uncontrolled secondary interference sources, such as Amateur Radio, Part 15 unlicensed systems and Industrial, Scientific, (and) Medical (ISM) systems operated under Part 18 of the FCC rules".[3] If the DSRC devices are in fact so sensitive that they require protection from Part 15 and 18 devices and Amateur stations, notwithstanding the path distances DSRC devices would utilize, then they have no business proposing operation in a band such as 5.850-5.925 GHz, given the current allocation status thereof.[4] Instead, for such short-range operation, DSRC devices should be developed in the bands above 40 GHz, where sufficient bandwidth exists without incumbent uses which are potential interference sources. The 3M comments paint a bleak picture indeed of the interference susceptibility of DSRC devices, and their incompatibility with incumbent users:

> 3M is aware that secondary users operate on the condition that they do not cause harmful interference to primary users. But even though a user may have secondary status, such as is the case with the Amateur Service, the safety and reliability of DSRC will be compromised until the source of the interference is located and eliminated. For example, licensees in the Amateur Radio Service generally do not have site-specific licenses, and may operate at high power levels;

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[3] 3M Comments, at 7.

[4] As discussed in the League's comments previously filed, the band 5.850-5.925 GHz is allocated on a primary basis to the fixed satellite (Earth-to-space) service for non-government operations, and as well to the Radiolocation service for Government operations (military only). In ITU Region 2, the band is part of the 5.650-5.925 GHz allocation to the Amateur Service, on a secondary basis. The segment 5.850-5.875 GHz is part of the band 5.725-5.875 GHz designated for use by Industrial, Scientific and Medical (ISM) devices. That segment is also used by relatively high-powered Part 15 devices, pursuant to Section 15.249 of the Commission's Rules. There are substantial government radar operations in the 5.850-5.925 GHz band, which would presumably involve substantial limitations on shared uses of the band. The Amateur-Satellite Service is authorized to use the segment 5.650-5.670 GHz (Earth-to-space) and 5.830-5.850 GHz (space-to-Earth) on a secondary basis. The Amateur Service allocation at 5.850-5.925 GHz is in ITU Region 2 only.

> Part 15 devices, although operating at very low power levels, may cause harmful interference if the transmitter is in close proximity to a licensed station; and Part 18 devices, specifically "Industrial heaters and RF stabilized arc welders" above 5.725 GHz have no power limitations and are only required to limit out of band emissions "to the greatest extent possible". Harmful interference can occur to an ITS DSRC system without any prior notice, jeopardizing the safety of drivers relying on ITS DSRC systems for safety related functions. Without site specific licenses, it will be difficult to locate the source of any dangerous interference. Accordingly, 3M urges the Commission to remove secondary users from the proposed band.
>
> 3M Comments, at 7,8.

8. This point is directly at variance with the Petitioner's premise: in an attempt to justify the creation of an ITS DSRC allocation at 5.850-5.925 GHz in the first place, ITS America argued that there was compatibility with incumbent users. Thus, the propriety of the proposed allocation is drawn into serious question, for which the record provides no answers. If the DSRC devices are as susceptible to interference as 3M suggests, and if those devices have public safety implications, there is no possible justification for the DSRC allocation as proposed. There is absolutely nothing in the record in this proceeding which would allow a determination of the actual interference susceptibility of DSRC systems. No empirical evidence exists to establish whether 3M, a manufacturer, or the Petitioner, an industry association, is correct with respect to its representations. Both, however, cannot be correct. ITS America states, at page 47 of its Petition, as follows:

> Technical analysis indicates that ITS services can operate on a primary basis with existing government and non-government users in the 5.850-5.925 GHz band. The low power transmissions from ITS services provide little likelihood of harmful interference to any current users. Similarly, existing uses of the spectrum are unlikely to pose a threat of interference to DSRC. Studies of the radiators in and around this band indicate that the band is generally low in background emissions with out-of-band emitters providing the main source of potential interference to DSRC systems (footnote omitted). As explained below, out-of-band interference can be reduced with the use of mitigation techniques, allowing

DSRC systems to operate in an environment with minimal noise and manageable interference sources.

Further, at pages 49-50 of the Petition, ITS America states that:

> Non-government uses of the 5.850-5.925 GHz band include fixed satellite Earth-to-space uplinks and ISM, along with amateur radio operators authorized on a secondary basis and Part 15 devices. Interference studies indicate that DSRC systems can co-exist with all existing users with employment of currently available mitigation techniques...Finally, the use of mitigating techniques, such as roaming channel selection, can greatly minimize DSRC-based interference potential with ISM devices and other in-band and out-of-band users (footnote omitted).

Further, at page 51:

> Technical measures can greatly minimize any potential interference from (in-band) users. For example, filtering devices added to DSRC transceivers can reduce or eliminate out-of-band interference. (footnote omitted). In addition, a multi-stage transponder wake-up scheme can be incorporated to reduce activation from out-of-band emitters. Transponders operating in the 902-928 MHz band currently employ this technique. Finally, the ability to select an alternative channel for operation when located near a disruptive source ensures that DSRC systems can avoid interference from in-band and out-of-band users. ITS America realizes that the potential for interference may decrease DSRC system reliability and user acceptance. We fully support the ongoing efforts of FHWA, DoD, the Fixed Satellite Service, and Radio Amateurs in their efforts to identify and alleviate all potential interference concerns.

9. To further complicate matters, the ARINC technical study, Appendix H to the Petition, is silent on the issue of compatibility between Amateur Stations and DSRC systems. It states, at page 81 thereof, that:

> The currently allocated LMS band [902-928 MHz] does not have the bandwidth or authorization for operation that will allow all DSRC functions to be effectively implemented. The new applications (In-Vehicle Signing [Hazard Warning], Emergency Vehicle Signal Preemption, Transit Vehicle Signal Priority, Transit Vehicle Data Transfer, Off-Line Verification, ELP, Intersection Collision Avoidance, and Automated Highway System-to-Vehicle Communications) must operate on interference-free frequencies.

ITS America representatives have offered to conduct interference studies with the League to determine actual interference potential between DSRC devices and typical amateur radio station configurations. The League has offered the services of its laboratory to conduct these studies. The League remains ready, willing and able to participate at short notice. Whenever ITS America is prepared to participate, those tests can be conducted. Until then, any action on this Petition is highly premature.

10. As discussed at Paragraph 10 of the League's Comments in this proceeding, any DSRC allocation in this band will have the effect of reducing the utility of it to the Amateur Service. The League urgently requested in those Comments, and reiterates now, that, in any rulemaking proceeding based on the ITS America Petition, the Commission propose *at the same time* the amendment of the Table of Allocations domestically: (1) to make the Amateur Service and the Amateur-Satellite Service primary at 5.825-5.850 GHz (subject only to protecting Government Radiolocation from interference, and to received interference from Government Radiolocation, and from ISM devices operating under Part 18); and (2) to modify the Amateur and Amateur-Satellite allocation at 5.650-5.725 GHz, to primary status. These actions are necessary to accommodate the reduction in utility that will result as a practical matter from the recent U-NII allocation at 5.725-5.825 GHz, and the proposed DSRC uses in the 5 GHz band, notwithstanding the retention of the amateur secondary allocations at 5.725-5.825 GHz and 5.850-5.975 GHz.

11. As the foregoing indicates, there is no consensus in the comments regarding the extent of the costs and disadvantages involved in use of the 5.850-5.925 GHz band for ITS applications, and whether 902-928 MHz or other bands would prove more suitable and more cost-effective for ITS purposes. There is also serious confusion as to whether use of the band

for DSRC is compatible with existing incumbent Part 15 and 18 users, and the Amateur Service. This confusion is apparently due, as Mark IV noted, to the current lack of information regarding protocols, channelization requirements, and propagation characteristics which might eventually be used in ITS applications. There is simply no empirical evidence offered by the Petitioner, or by the commenters which are supportive of the Petition, sufficient to permit a determination whether or not there is compatibility between existing uses in the band, including Amateur Radio, and ITS DSRC operations; whether 75 MHz of spectrum is or is not the minimum allocation necessary to implement ITS DSRC; or whether the band 5.850-5.925 GHz, *vice* the 902-928 MHz band, or the bands above 40 GHz, is best suited to accommodate ITS DSRC services without disruption of incumbent users.

12. Given the lack of information regarding critical technical aspects of the ITS America proposal, the League respectfully reiterates that any action taken by the Commission on the Petition is premature. The next step should, at most, be the issuance of a Notice of Inquiry. The Commission should call for objective evidence regarding the channelization needs and propagation characteristics of DSRC devices; consideration of alternative frequency bands; completion and submission of compatibility studies regarding ITS/DSRC devices and incumbent radio services at 5.850-5.925 GHz; a determination of protection criteria, if necessary; and identification of replacement spectrum for displaced users *before* any proposed implementation of a ITS/DSRC Service.

Respectfully submitted,

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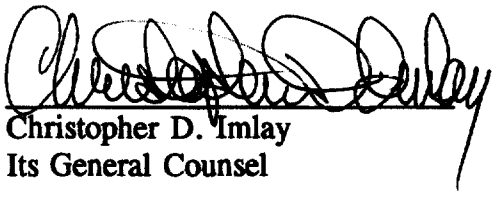
By: 
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September 17, 1997

CERTIFICATE OF SERVICE

I, Christopher D. Imlay, do hereby state under penalty of perjury that I did cause copies of the foregoing Reply Comments of the American Radio Relay League, Incorporated, to be mailed, postage prepaid, to the following, the 17th day of September 1997:

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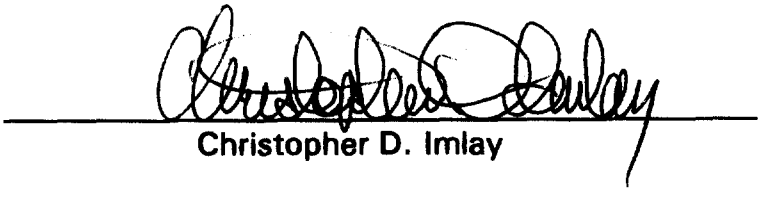

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